In the Claims:

Listing of all claims:

1-47 (Cancelled.)

48. (New) An apparatus for welding by depositing drops of molten metal at the end of a consumable welding wire into a weld puddle by short circuit transfer welding, comprising:

a power source having a first waveform during a short condition and a second waveform during an arc condition as an output, wherein the output is in electrical communication with the welding wire;

a feedback circuit, for providing a signal indicative of the output being in the short or the arc condition;

a controller, coupled to the feedback circuit, and having a control output provided to the power source, wherein the control output commands the first waveform to be a current waveform and the second waveform to be a voltage waveform.

49. (New) The apparatus of claim 48, wherein the feedback circuit includes a comparator.

50. (New) The apparatus of claim 49, wherein the comparator receives a threshold voltage and a signal responsive to output voltage as inputs.

51. (New) The apparatus of claim 48, wherein the feedback circuit includes as an output a real-time signal indicative of the heat input to each drop.

52. (New) The apparatus of claim 51, wherein the controller controls the first and second waveforms to provide a desired mass deposition rate responsive to a wire feed speed and a distance from a tip of the wire to the workpiece.

53. (New) The apparatus of claim 52, wherein the feedback circuit has an output current feedback signal and an output voltage feedback signal provided to the controller, and wherein the controller controls the first waveform in response to the output current feedback signal and the second waveform in response to the arc voltage feedback signal.

54. (New) The apparatus of claim 48, wherein the feedback circuit has an output current feedback signal and an output voltage feedback signal provided to the controller, and wherein the controller controls the first waveform in response to the output current feedback signal and the second waveform in response to the arc voltage feedback signal.

55. (New) An apparatus for welding by depositing drops of molten metal at the end of a consumable welding wire into a weld puddle by short circuit transfer welding, comprising:

power means for providing power in the form of a first waveform during a short condition and a second waveform during an arc condition to the welding wire;

feedback means for providing a signal indicative of the output being in the short or the arc condition;

control means for controlling the power means in response to the feedback means, wherein the power means is controlled such that the first waveform is a

current waveform and the second waveform is a voltage waveform.

56. (New) The apparatus of claim 55, wherein the feedback means includes a means for comparing two signals.

57. (New) The apparatus of claim 56, wherein the comparator means receives a threshold voltage and a signal responsive to output voltage as inputs.

58. (New) The apparatus of claim 56, wherein the feedback means includes means for providing a real-time signal indicative of the heat input to each drop.

59. (New) The apparatus of claim 57, wherein control means includes means for controlling the first and second waveforms to provide a desired mass deposition rate responsive to a wire feed speed and a distance from a tip of the wire to the workpiece.

60. (New) The apparatus of claim 55, wherein the feedback means provides an output current feedback signal and an output voltage feedback signal provided to the control means, and wherein the control means includes means for controlling the first waveform in response to the output current feedback signal and the second waveform in response to the arc voltage feedback signal.

61. (New) A method of short circuit welding, comprising:

providing power in the form of a first waveform during a short condition and a second waveform during an arc condition to a welding wire;

providing a feedback signal indicative of the output being in the short or the arc condition;

controlling the power in response to the feedback such that the first waveform is a current waveform and the second waveform is a voltage waveform.

62. (New) The method of claim 61, further comprises comparing two signals.

63. (New) The method of claim 62, wherein comparing includes comparing a threshold voltage and a signal responsive to output voltage.

64. (New) The method of claim 61, further comprising providing a real-time signal indicative of the heat input to each drop.

65. (New) The method of claim 60, further comprising controlling the first and second waveforms to provide a desired mass deposition rate responsive to a wire feed speed and a distance from a tip of the wire to the workpiece.

66. (New) The method of claim 63, further comprising providing an output current feedback signal and an output voltage feedback signal to the control means, and controlling the first waveform in response to the output current feedback signal and the second waveform in response to the arc voltage feedback signal.

67. (New) The method of claim 63, further comprising providing an output current feedback signal and an output voltage feedback signal to the control means, and controlling the first waveform in response to the output

current feedback signal and the second waveform in response to the arc voltage feedback signal.